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H1N NJA N704 N73X
U1S S1820 S1934

(56) Documents Cited

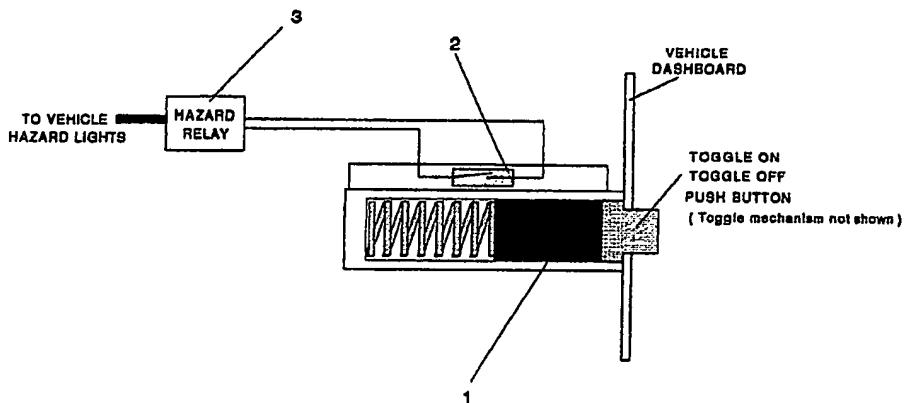
GB 2269947 A GB 2269493 A GB 2239137 A
GB 2223366 A GB 2119880 A GB 1463524 A
GB 0942719 A EP 0292633 A1 US 4723078 A
US 3939316 A

(58) Field of Search

UK CL (Edition M) F4R RFC , H2H HSV2
INT CL⁵ B60Q 1/44

(54) Vehicle hazard warning system

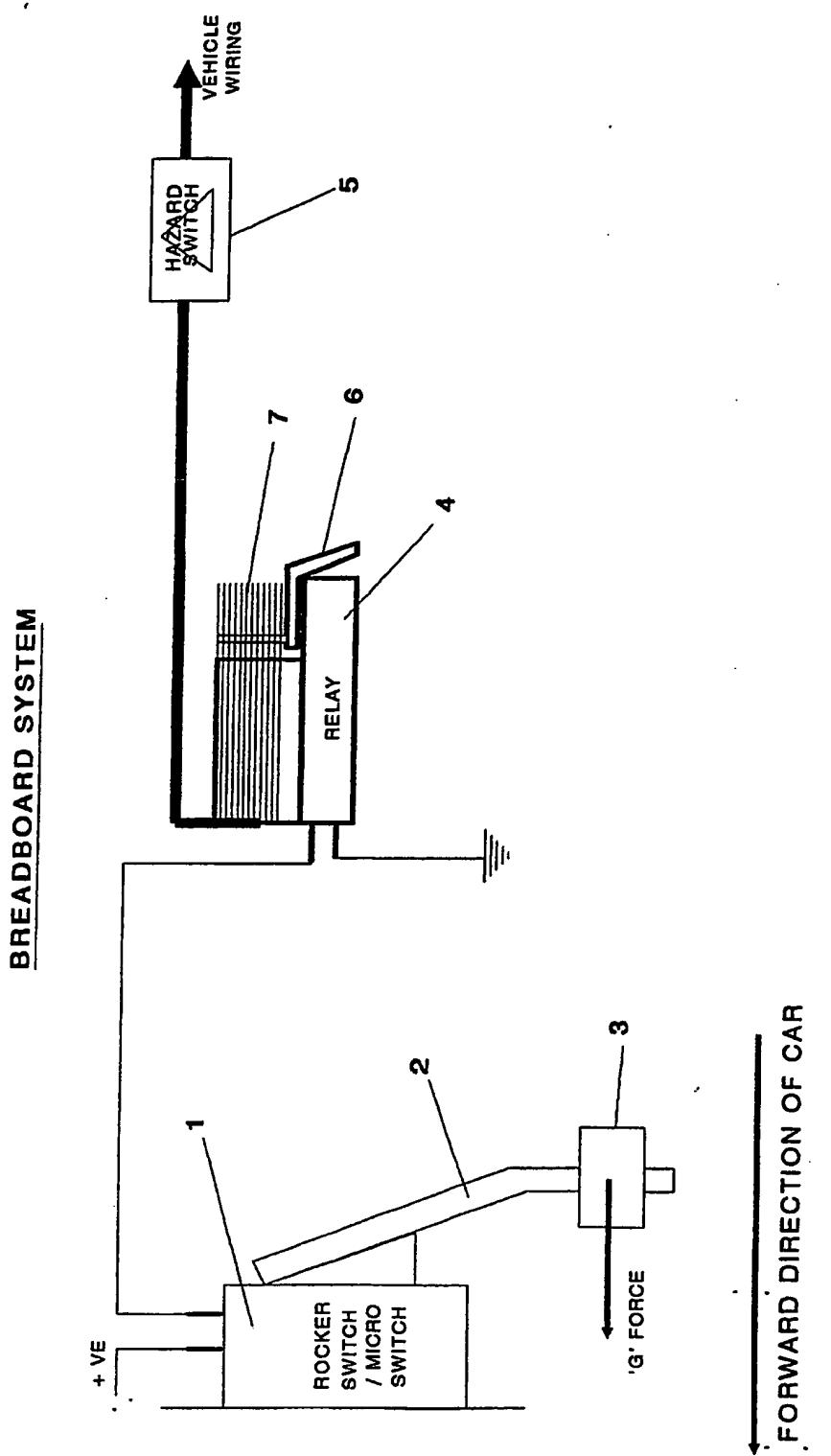
(57) When the vehicle is subjected to hard braking and/or an impact, a magnet 1 slides forward and is latched in position. The contacts of a reed relay 2 are therefore closed causing energisation of a relay 3 which operates the hazard lights. The system is reset by pushing the button of a toggle mechanism.



MAGNETIC 'G' SWITCH
FIGURE 5

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**FIGURE 1**

PRODUCTION SWITCH CONCEPT

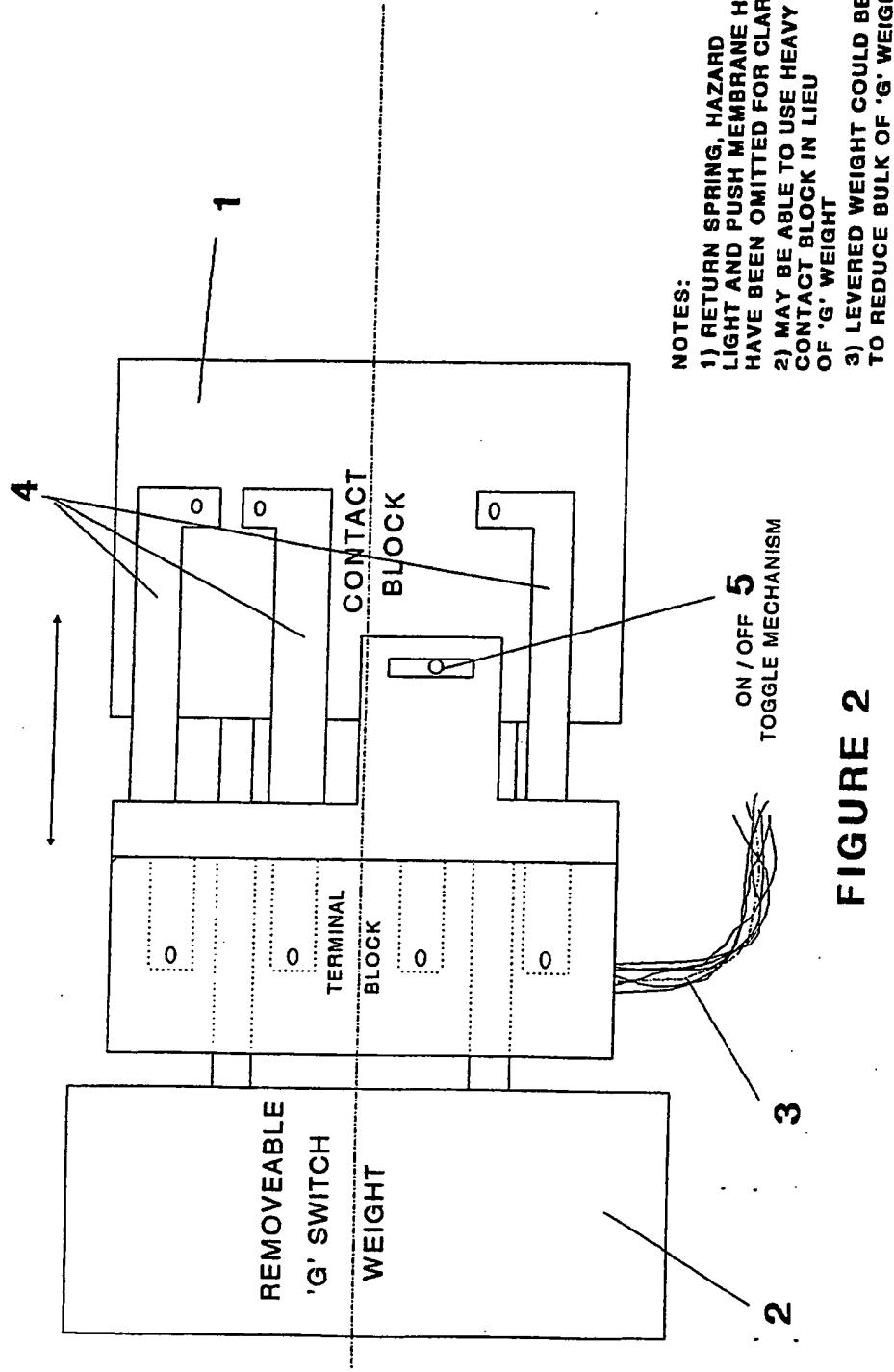


FIGURE 2

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SPIRAL FLAT SPRING 'G' SWITCH

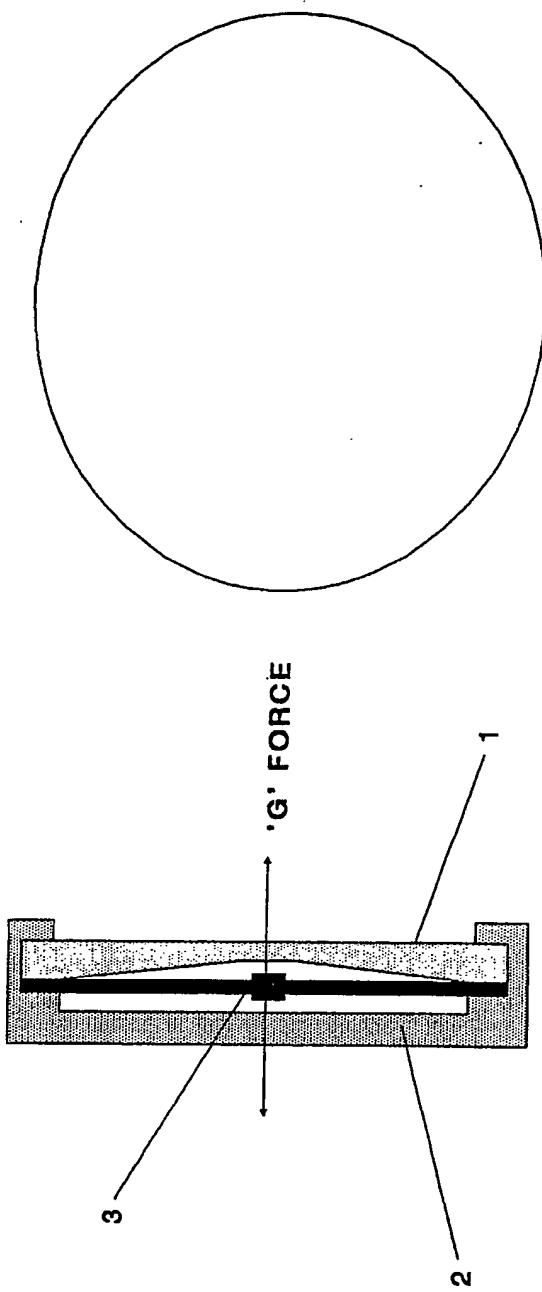
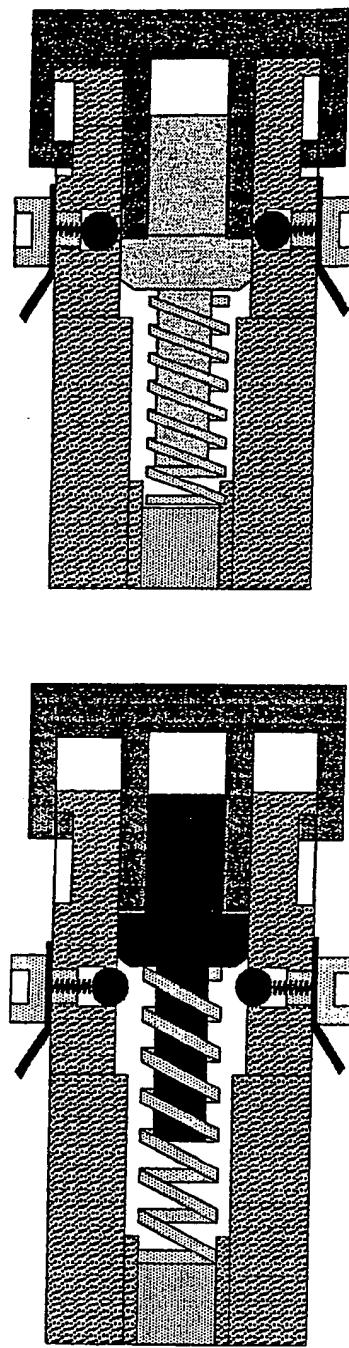


FIGURE 3

'G' SENSITIVE LATCHING SWITCH



BEING RESET

READY FOR OPERATION

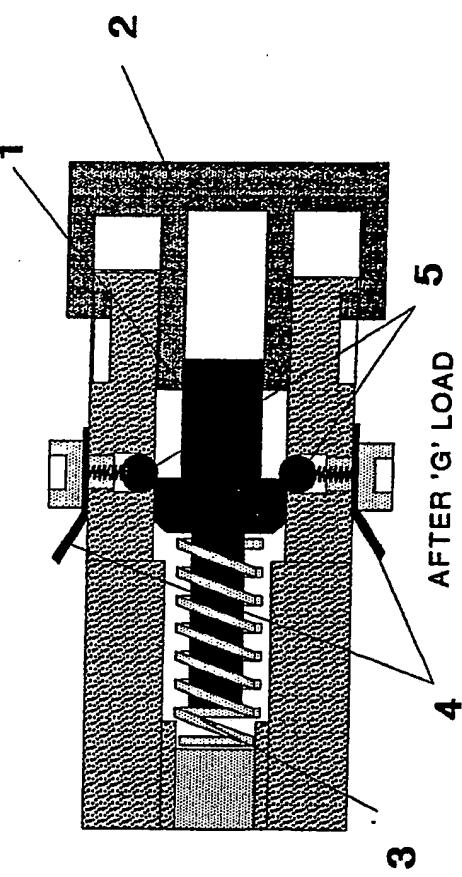
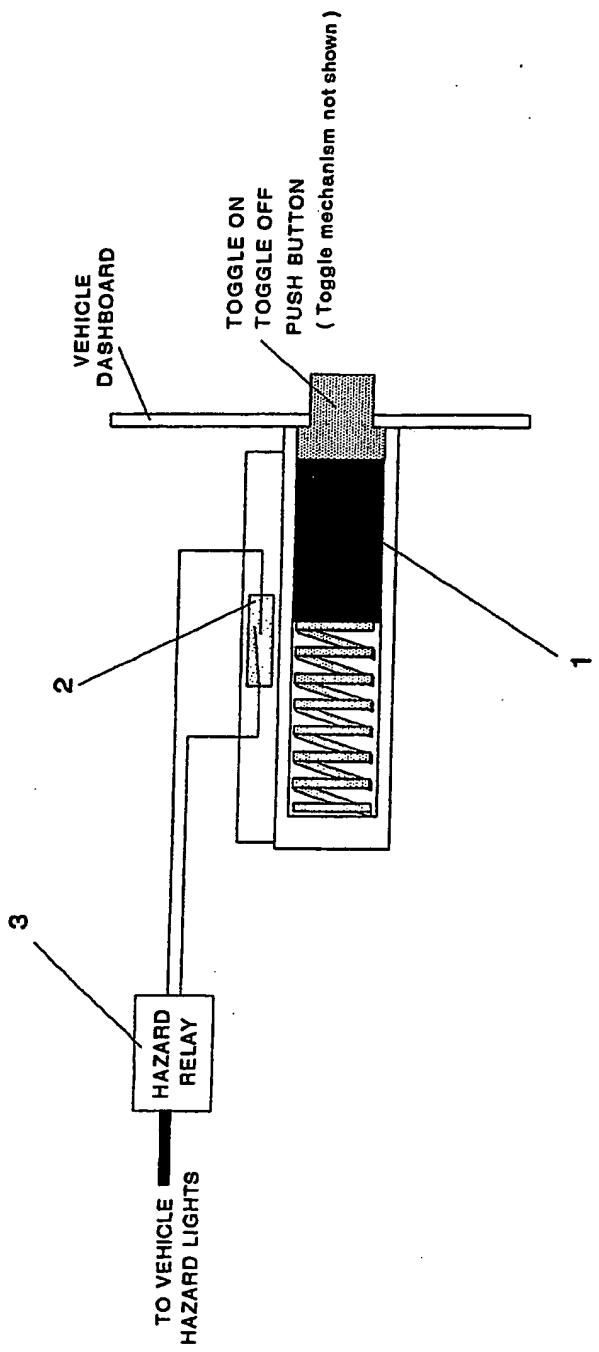


FIGURE 4

MAGNETIC 'G' SWITCH
FIGURE 5



VEHICLE HAZARD SYSTEM

This invention relates to automatic operation of a vehicles hazard warning lights on either, or both emergency braking and vehicle impact. This is achieved by sensing either the vehicles 'g' force (acceleration or deceleration) and/or the vehicles braking force.

Hazard warning lights are intended to give early warning to other vehicles of a potentially hazardous situation, often a vehicle braking strongly or actually stopped after braking hard or after a collision. Hazard warning lights as currently configured sometimes do not achieve adequate warning. On severe braking, by the time the driver has struggled to control the steering, actually come to a stop, collected his wits, remembered where the hazard warning lights are and then pressed them it may be too late for the following driver who could be closing the gap at 70MPH and not realize anything is wrong.--BRAKE LIGHTS TELL YOU NOTHING ABOUT THE SEVERITY OF THE BRAKING OF THE CAR IN FRONT OR SOMETIMES EVEN THAT THE CAR IS REDUCING SPEED AT ALL-

In a 'crash' scenario the likelihood of the driver being able to operate the hazard lights in time to warn following vehicles is even less than the severe braking scenario.

An automatic hazard warning system would however virtually instantaneously switch on the hazard system giving maximum warning to following vehicles. Manual operation of the system would not need to be sacrificed

SENSING THE 'G' FORCE

This aspect of the invention utilises the 'g' force generated in severe braking or during vehicle impact to automatically activate the hazard warning lights.

The methods of sensing the 'g' level and activating the hazard lights are numerous as are the combinations and permutations of those methods. Also in use it is possible for the invention to be designed to operate as a hazard warning system which only operates on

- (a) forward vehicle impact
- or (b) rear shunts
- or (c) (a) and (b) together
- or (d) severe braking + (a)
- or (e) severe braking +(c)

Additionally the system could be added to a vehicle as an accessory or when the car is new. The invention as an accessory may take a different form to that of a system used in a new car.

All these variations on the implementation and usage make it impossible to cover every permutation and combination of the invention, however the following examples show some of the possible implementations of the invention.

Figure 1 shows a breadboarded version of the invention. The 'g' force experienced on severe braking or vehicle impact causes the weight 3 to operate the switch 1 via the mechanical advantage of lever 2. The switch then supplies voltage to the relay 4 which operates the contacts 7 which are connected in parallel with the vehicles hazard warning switch. The system can be reset directly by manual reset of the switch or the system could be en-cased and an extension to the switch to the dashboard used to rest it.

As an alternative the Rocker / Micro switch could be eliminated by connecting lever 2 and weight 3 to the relay rocker arm 6 and then the relay wired to 'latch' on first contact caused by the 'g' force. This system could be reset by momentarily cutting the supply to the relay. This could be via a simple on/off switch on the dashboard.

Figure 2 shows a 'production concept' version which incorporates the 'g' sensor within the hazard switch. The 'g' force causes weight 2, which is connected to or part of the contact block 1, to move the contact block 1 in relation to the spring contacts 4 and thus make the necessary connections via the wiring loom 3 to operate the hazard warning lights. Re-pushing the contact block 1 causes the on / off toggle mechanism 5 to reset the system. This version would be either as a direct replacement for an existing hazard switch or fitted in new vehicles instead of the standard 'manual only' hazard switch.

Figure 3 shows a 'flat spiral spring' 'g' sensor which is bi-directional in operation. There are three components within this sensor, the top contact 2, the flat spiral spring and central contact 3 and the bottom contact 1. On 'g' force in either the forward or rearward direction the central contact 3 makes temporary contact with either the top contact 2 or the bottom contact 1. The sensor can be connected to simple latching electronics and contacts or a relay as above.

Figure 4 shows another style of 'g' sensitive switch. In operation the weight 1 compresses spring 3 and latches under the sprung ball contacts 5 causing the electrical connection of contacts 4. The contacts 4 are connected to a relay which in turn is connected to the vehicle hazard wiring. Resetting the system is by pushing button 2. This system could be used either as a replacement of the hazard warning switch or as a separate system connected in parallel.

figure 5 shows another style of 'g' sensitive switch. In operation the magnet 1 slides against spring pressure under the 'g' force and then latches in position. When in the latched position the reed relay 2 is closed causing operation of the relay 3 which operates the Hazard lights. The hazard system can be reset using the 'push on' 'push off' toggle mechanism.

The use of a strain gauge could also be used to sense the 'g' force.

VEHICLE BRAKING FORCE

Rather than using the vehicles 'g' force to operate the vehicles Hazard system the braking force could be utilized instead. This method would cope with most emergency braking scenarios except vehicle impact without severe braking. It does however have the advantage over the 'g' sensing system that the hazard lights would operate even in a 'skid' scenario.

A method of sensing a braking force could be by using a pressure sensing switch on the hydraulics of the braking system which when the braking force was sufficiently high to warrant operation of the Hazard system the pressure switch would close and operate the hazard lights via a relay.

Clearly by combining in parallel the sensing of the vehicles 'g' force and the 'Braking' force a more comprehensive system would result, dealing with most, if not all emergency scenarios calling for operation of the Hazard lights.

CLAIMS

1. An Automatic Vehicle Hazard Warning System comprising an impact and/or a 'hard braking' sensor system, and an external visual indication of occurrence of hard braking and/or impact.
2. An Automatic Vehicle Hazard Warning system as claimed in Claim 1, wherein a unidirectional or multidirectional 'g' sensor is used to sense hard braking and/or impact.
3. An Automatic Vehicle Hazard Warning system as claimed in Claim 1 or Claim 2, wherein braking force/pressure is used to sense hard braking.
4. An Automatic Vehicle Hazard Warning system as claimed in Claim 2 and/or Claim 3, wherein the visual indication is by use of the Vehicles Hazard Warning Lights.
5. An Automatic Vehicle Hazard Warning System as claimed in Claim 1, wherein the visual indication is by use of the Vehicles Hazard Warning Lights.
6. An Automatic Vehicle Hazard Warning System as claimed in Claims 1 through to and including Claim 5, wherein the visual indication is by use of additional vehicle lights or the vehicles brake or side light system.
7. An Automatic Vehicle Hazard Warning System as claimed in Claim 1, wherein the visual indication of 'hard braking' and/or vehicle impact is via the Vehicles Hazard Warning Lights.
8. An Automatic Vehicle Hazard Warning System as claimed in Claim 1, wherein the visual indication of 'hard braking' or vehicle impact is via the use of additional vehicle lights or the vehicles brake or side lights.
9. Any Automatic Vehicle Hazard warning system substantially as described herein with reference to Figures 1 to 5 of the accompanying Drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

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-5-

Relevant Technical Fields		Search Examiner C D STONE
(i) UK Cl (Ed.M)	H2H (HSV2); F4R (RFC)	
(ii) Int Cl (Ed.5)	B60q/1/44	Date of completion of Search 12 DECEMBER 1994
Databases (see below)		Documents considered relevant following a search in respect of Claims :-
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.		All
(ii)		

Categories of documents

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Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X,E	GB 2269947 A	(DAVIDSON-PAGE)	1 at least
X,E	GB 2269493 A	(NEALE)	1 at least
X	GB 2239137 A	(BELL)	1 at least
X	GB 2223366 A	(BOVIS)	1 at least
X	GB 2119880 A	(BURTON)	1 at least
X	GB 1463524	(BOUCHARD)	1 at least
X	GB 942719	(STOCKHAUSEN)	1 at least
X	EP 0292633 A1	(SHETTINO)	1 at least
X	US 4723078	(DAIMLER-BENZ)	1 at least
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